



The original Roundup® herbicide¹, containing the active ingredient glyphosate, was introduced in 1974. Today, Roundup® WeatherMax, Roundup® UltraMAX, and other glyphosate agricultural herbicides produced by Monsanto are among the world's most widely used herbicides. Monsanto's glyphosate products are registered in more than 130 countries and are approved for weed control in more than 100 crops. No other herbicide active ingredient compares in terms of number of approved uses.

Roundup® WeatherMAX and other Roundup brand agricultural products are broad-spectrum, non-selective herbicides, which are active on most species of green plants. In addition to glyphosate, the formulations typically include water and a surfactant system. The surfactant system enables the products to adhere to the surface of leaves so the active ingredient can penetrate. When the products are applied to green leaves or stems, the active ingredient moves throughout the plant so the entire plant dies. A few days after treatment, the plant wilts and yellows. Then, as the plant tissue deteriorates, the plant turns brown. At the same time, the roots or rhizomes are deteriorating so the plant cannot regenerate.

Glyphosate binds tightly to most types of soil so it is not available for uptake by roots of nearby plants. It works by disrupting a plant enzyme involved in the production of amino acids that are essential to plant growth. The enzyme, EPSP synthase, is not present in humans or animals, contributing to the low risk to human health from the use of glyphosate according to label directions.

In addition to agricultural uses, herbicides containing glyphosate are used to control weeds in utility rights-of-way, on roadsides, along railways or in places around the home such as sidewalks and gardens. Some products for the residential market may include additional active ingredients at a much lower concentration than glyphosate. These products are used when a faster response is desired in the targeted weeds, or when extended weed control is desired. Herbicides containing glyphosate are also used by wildlife organizations to protect and restore wildlife habitats threatened by invasive, non-native vegetation. For example, a Monsanto glyphosate herbicide was selected to control invasive weeds in the unique Galapagos Islands ecosystem.

Another glyphosate herbicide, AquaMaster™, is approved for weed control in aquatic environments, including ponds and reservoirs, waterfowl sanctuaries and recreational waterways. Only a few herbicides have toxicological and environmental characteristics that allow them to be directly applied to aquatic vegetation. The AquaMaster™ formulation (under a previous brand name) was selected to rid the Florida Everglades of invasive weeds.

Conservation groups have chosen glyphosate formulations because of their effectiveness against most weeds and the fact that glyphosate has very low toxicity to wildlife. Because of its multiple uses, glyphosate has been the subject of hundreds of health, safety and environmental

¹ "The original Roundup herbicide" refers to the Roundup agricultural herbicide (also known as MON 2139), which contained the active ingredient glyphosate (as the isopropylamine salt), water and a surfactant (polyoxyethylene-alkylamine or POEA).

studies. Regulatory agencies around the world have concluded that glyphosate herbicides pose no unreasonable risks to human health and the environment when used according to label directions.

Glyphosate holds an elite position among honored technologies. John Franz, the Monsanto scientist who first identified the herbicidal activity of glyphosate, received the National Medal of Technology, the highest honor for technical achievement, in 1987, at which time the original Roundup® agricultural herbicide was recognized for its impact “upon the production of agricultural food and fiber as well as agricultural practices throughout the world.” Very few agricultural technologies have won the nation’s technology award. In 1996, Monsanto received the Presidential Award for Sustainable Development. The White House recognized Monsanto for “pioneering sustainable technologies,” which included the development of such products as the original Roundup herbicide. Also in 1996, Monsanto received the Presidential Green Chemistry Challenge Award for environmentally responsible systems used in the manufacture of glyphosate herbicides.

In addition, Farm Chemicals magazine, in its September 1994 100th anniversary edition, called the original Roundup® herbicide one of the “Top 10 Products That Changed the Face of Agriculture.” That designation was based in large measure on the fact that Roundup agricultural herbicides enable and encourage the practice of conservation tillage. Their broad-spectrum effectiveness allows farmers to control weeds with minimal tillage. This conserves valuable topsoil, reduces runoff into streams and reduces trips across farm fields, conserving time and fuel.

When Roundup WeatherMAX™ is used over the top of Roundup Ready® crops according to label directions, most common weed species are controlled without harm to the growing crop. In most cases, farmers are able to replace multiple herbicide products with Roundup WeatherMAX™, reducing the overall amount of herbicide that is used. And in many cases, only one herbicide application is required, conserving fuel by reducing trips across the field.

All pesticides sold or distributed in the United States must be registered by the Environmental Protection Agency (EPA), based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides that were first registered years ago be reregistered periodically to ensure that they meet the current standards. Glyphosate was re-registered in September 1993 after EPA reviewed new studies and concluded that the use of glyphosate-based herbicides in accordance with label directions would “not pose unreasonable risks or adverse effects to humans or the environment.”

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